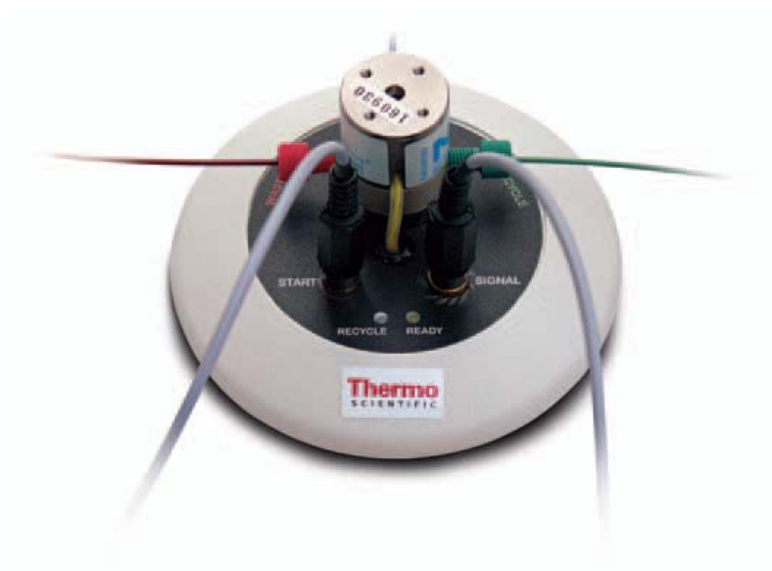


Thermo Scientific
SRS Pro
Solvent Recycling System
Users Guide



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Chromatography Resources

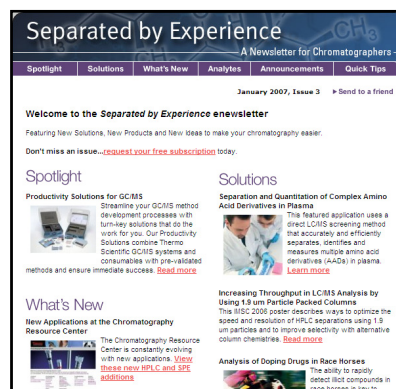
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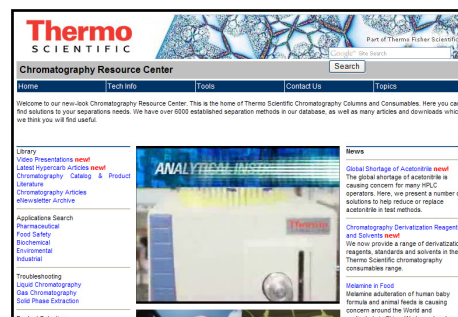
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Introduction

Thermo Scientific SRS Pro solvent recycling system can reduce mobile phase consumption by up to 90%. This is achieved by continuously monitoring the output signal of the chromatographic detector, recycling the mobile phase to the solvent reservoir when the baseline is below a certain preset threshold.

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Product Description

Thermo Scientific SRS Pro solvent recycling system can reduce mobile phase consumption by up to 90% by redirecting untainted mobile phase to the solvent reservoir during isocratic HPLC operation.

With a modern, compact design and innovative features, SRS Pro brings a fresh approach to solvent recycling. No power adapter is required as the solvent saver is powered directly from the chromatography data system PC through a USB connection.

User friendly software is provided to configure the system parameters, and also includes on-line monitoring and audit trail facilities.

Analog input to SRS Pro allows for unipolar or bipolar operation of the device within a range of $\pm 1V$. An analog-to-digital converter facilitates further evaluation by the built-in processor.

TTL/contact closure for the device can be configured as start, auto-zero or valve position control input.

Principle of Operation

Thermo Scientific SRS Pro continuously monitors the output signal of the chromatographic detector, recycling the mobile phase to the solvent reservoir when the baseline is below a certain preset threshold. Operation of SRS Pro is illustrated in Figure 1.

If the input signal level exceeds this threshold value (a), SRS Pro redirects the eluent flow to waste, with a delay taking account of the transport time from the detector to the switching valve.

When the signal returns below the threshold (b), SRS Pro again waits for the transport delay and then switches the mobile phase back to the reservoir.

To ensure consistent operation in an automated environment, zeroing of the signal input at the point of injection can be performed by connecting the autosampler injection marker signal to SRS Pro.

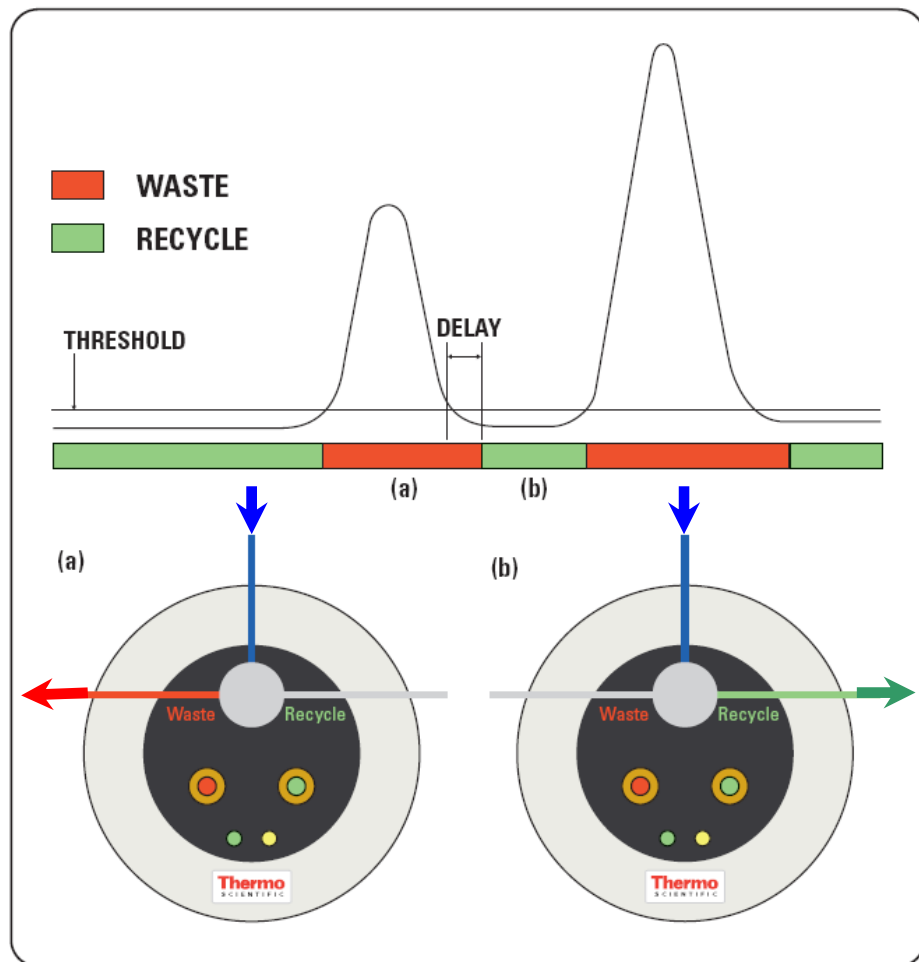


Figure 1: SRS Pro Principle of Operation

In order to protect the integrity of the mobile phase supply, SRS Pro is designed to recycle the mobile phase only if switched on. The normal position of the 3-way valve is waste. Therefore, in case of power failure the valve remains in the waste position and the mobile phase in the reservoir remains uncontaminated.

Getting Started

Unpack the SRS Pro Solvent Recycler. The box should contain the following items:

- SRS Pro Solvent Recycler
- Connectors (Qty 3)
- Ferrules (Qty 3)
- Electrical cables (Qty 2)
- pFTE tubing
- User manual
- Quick start guide
- System CD

Tubing Connection

SRS Pro can be connected to the HPLC system using 1/16" PTFE tubing and flange free fittings. Ferrules must be placed in the proper position against the nut as illustrated in Figure 2.



Figure 2: Tubing connection

The mobile phase output from the detector should be connected to the common port of the 3-way valve of recycler (marked as **DETECTOR**). The outlet port of the 3-way valve marked as **RECYCLE** should be connected to the mobile phase reservoir. The outlet port of the 3-way valve marked as **WASTE** should be connected to the solvent waste bottle.

Software Installation

Installation of the software package should be performed **prior** to connection of SRS Pro to the computer. To install the software, insert the software CD into the drive on your computer. The installation process will normally start automatically. If the auto play function is disabled, run *setup.exe* from the root folder of CD. Follow the instruction of the installer.

Electrical Connection

Connect the **SIGNAL** input of SRS Pro with the integrator (1V Full Scale) output from the HPLC detector using the cable provided as illustrated in Figures 3 to 5.

If using a UV6000 detector, locate the “OUTPUT” screw terminal on the rear panel as shown in Figure 3 above. C Using the standard analog input cable, connect the blue wire to the CH1+ position and the black wire to CH1– position. Channel 2 can be used alternatively. It is necessary to setup analog output within the instrument software prior to using SRS Pro.

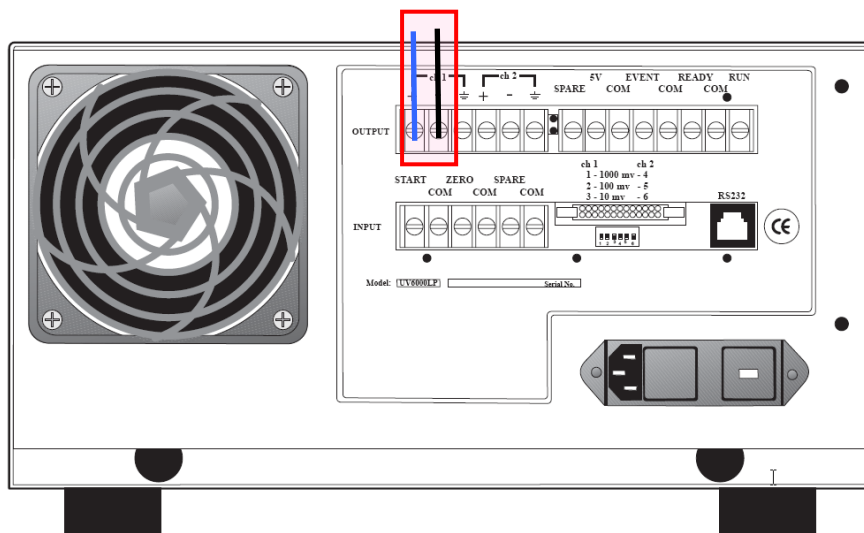


Figure 3. Connecting the start cable to Thermo Scientific UV6000 detector

If using Surveyor or Accela detector, again use the standard cable supplied. Connect the blue wire to the CHA– 1V output and the black wire to GND A positions. Channel B can be used alternatively. It is necessary to setup analog output within the instrument software prior to using SRS Pro.

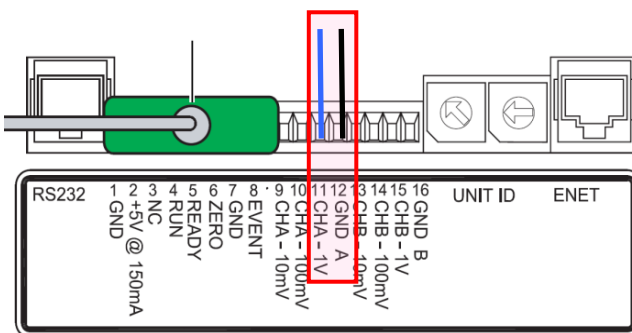


Figure 4. Connecting the start cable to Thermo Scientific Surveyor or Accela detector

If using an Agilent detector, connect the analog signal output on the rear panel to SRS Pro using the BNC analog input cable provided. Set the analog output to 1 Volt FS in the instrument software.

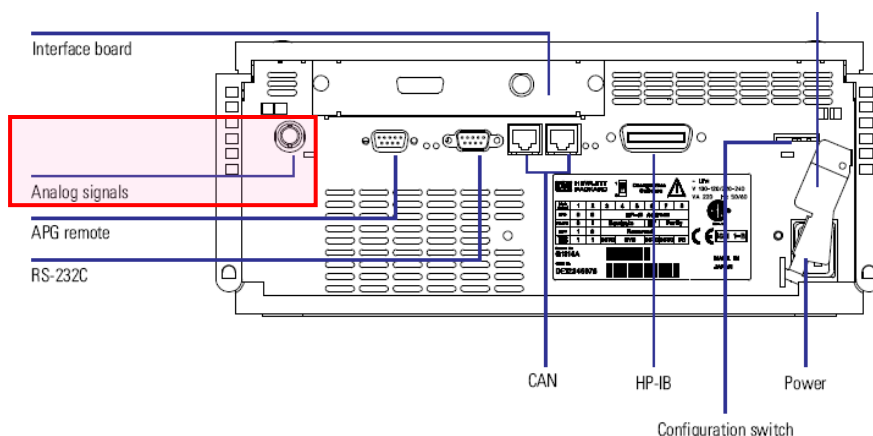


Figure 5. Connecting the start cable to Agilent detector

If auto zero of SRS Pro is required, the **START** input should be connected to the contact closure of the HPLC autosampler. This contact closure must be activated at the moment of injection. The default function is auto zero. If the output of the autosampler is polarized (e.g. open collector output), respect the polarity of START input (it has an internal pull-up resistor).

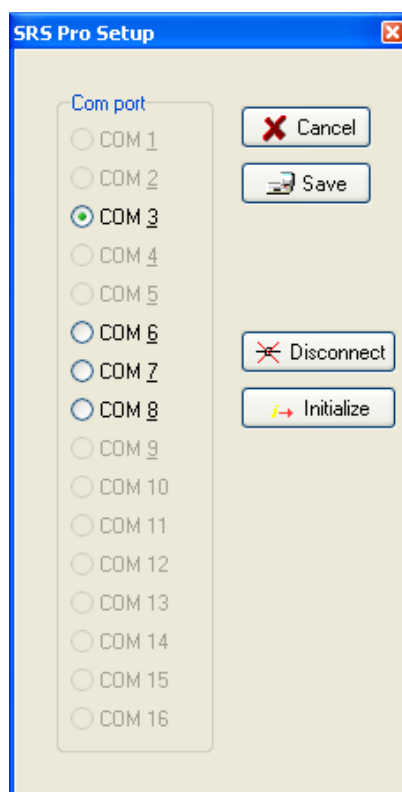
Connect the USB cable of solvent recycler to the PC, ensuring that the software and drivers have already been installed.

Initial Setup

SRS Pro has built in USB interface. Communication with the system PC (running MS Windows operating system) is accomplished via “virtual com port driver” using simple text protocol. It is recommended that communication between the system PC and SRS Pro is performed using the provided software, although it may also be performed using any terminal program (e.g. Windows Hyperterminal).

After connection of SRS Pro to the system PC, the operating system will recognize the hardware and install the necessary virtual com port driver. Use the Windows hardware manager to detect com port number reported

as "USB Serial Port". It is necessary to set this com port number later in SRS Pro software setup.



Start the SRS Pro application. It is possible that an error message "Invalid port number" may be seen the first time the application is opened. Ignore it (by clicking OK) and continue with the setup. A new "recycle" icon ♻ will appear on the Windows task bar. It is now possible to open the local menu and select *Setup* by right mouse clicking on the icon. The desired com port can now be selected as illustrated in Figure 6. If the appropriate com port is currently unavailable, click the *Disconnect* button. Then click *Save* button. The solvent recycler is now ready for communication with the control application.

Figure 6: Selecting the com port

Before using SRS Pro, the *Threshold* and *Delay* parameters need to be correctly set in accordance with the properties of the chromatographic system.

The SRS Pro system status window can be activated by right click on saver task bar icon and selecting the *Show Status* option.




The threshold value is set by entering the desired value into the threshold edit box (200 mV has been entered as shown in Figure 7) and selecting the *Set Threshold* button (marked with his icon ). The value is now stored in SRS Pro nonvolatile internal memory.



Figure 7: Setting the threshold level.

In a similar manner, the delay value is set by entering the desired value into the delay edit box and selecting *Set Delay* button (marked with icon ). A typical setting will be between 0 and 5 seconds, depending on tubing length and flow rate.

To zero the system, wait until detector baseline is stable. Zero your detector signal and then select the *Auto Zero* () icon on the speed bar of SRS Pro status window.

Specifications

- Powered from PC USB port
- Input range $\pm 1V$, optimized for “integrator” detector output
- 12 bit analog-to-digital converter
- 1 Hz data rate
- LED indication of WASTE/RECYCLE positions
- Manual WASTE/RECYCLE control
- User configurable TTL/contact closure input
- Compatible with any HPLC detector
- Wetted material: PEEK
- Connection: 1/4-28 Flat Bottom
- Maximum pressure: 30 psi/0,2 MPa
- Only two operating parameters – Threshold, Transport Delay
- Easy Plug & Play Installation
- Drivers and Software Included

Computer Requirements

Personal computer (data system) running Microsoft Windows™ 98/2000/XP/Vista(32) with one free USB port.

Contact Information

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